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Three Decades of World Recreational Fishing Conferences: What Have We Learned About the Dynamics of Recreational Fisheries?

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ABSTRACT

Recreational fishing extends beyond catching fish, by connecting individuals with nature, generating environmental stewards, and contributing to local, regional, and national economies. Multi- and inter-disciplinary research, integrative management, and policy approaches can support better assessment of potential impacts of recreational fishing on social-ecological systems. Transdisciplinary thinking supports managing recreational fisheries effectively, but poses challenges for researchers and managers balancing specialized expertise with innovative, boundary-crossing perspectives in light of limited funding in a rapidly changing environment. The World Recreational Fishing Conference (WRFC) serves as the leading global scientific forum for addressing these challenges, by fostering interdisciplinary exchange among scientists, managers, policy makers, and stakeholders. Papers in this special issue represent the output of the last WRFC in Melbourne, Australia, in 2023. By reviewing the content of papers published in the present special issue, we illustrate the critical role of collaborative spaces, such as the WRFC series, in bridging different expertise and approaches and fostering innovation, thereby securing adaptive management and conservation of recreational fisheries in response to global changes. Evaluating the development of the WRFC over three decades highlights how this conference series represents a leading think tank serving the entire network of recreational fisheries professionals globally.

1 | History of World Recreational Fishing Conference

The World Recreational Fishing Conference (WRFC) is the only international scientific conference where recreational fisheries scientists, managers, policy makers, fishers of all types, private and corporate interest groups, and other stakeholders meet to share cutting-edge interdisciplinary and integrative science and case reports about recreational fisheries worldwide. The aspiration of the WRFC is to share current research trends, science

breakthroughs, network, share issues, and produce effective solutions for sustainable and resilient recreational fisheries. By building on the proceedings of the 10th WRFC published in this special issue of *Fisheries Management and Ecology*, we discuss how the WRFC evolved during the last three decades. We also reflect on how the conference series is supporting interdisciplinary researchers to balance specialized expertise and facilitate crossing disciplinary boundaries to advance the sustainability, productivity, and benefits of recreational fisheries locally, regionally, and globally.

The WRFC has become a tri-annual event held at varying locations across the world, but it was not always like that. Schratwieser et al. (2011) provided a first historical overview of the conference series in the proceedings of the 5th WRFC and highlighted early uncertainties surrounding the continuity of the event and its eventual establishment as a stable tri-annual conference. Nearly three decades after the first WRFC in Dublin, Ireland, in 1996, and with 10 conferences held and another upcoming in South Africa in 2026, the WRFC has firmly established as a crucial global event to attract scientists, managers, policymakers, and other stakeholders working in recreational fisheries from across the world (Table 1). Interestingly, the conference, now recognized as the 1st WRFC in Dublin, was organized by the Food and Agriculture Organization of the United Nations (Hickley and Tompkins 1998) and did not originally carry the "world" conference designation. In contrast, an earlier event—the "First World Angling Conference" held in Cap d'Agde, France, in 1984 (Stroud 1985)—included "world" in its title, but is not considered part of the WRFC series (Table 1). In hindsight, this exclusion may have been an oversight because it shared thematic similarities with the WRFC mission. Besides serving as a venue for exchanging the latest research on recreational fisheries, stakeholder participation and engagement have always been central to the WRFC. An emphasis on inclusivity and collaboration distinguishes the WRFC from more conventional scientific conferences (Schratwieser et al. 2011). Besides the WRFC serving as a meeting to exchange the latest science on recreational fisheries, stakeholder participation and engagement have always been important (Schratwieser et al. 2011), emphasizing how these elements set the WRFC apart from other, more standard scientific conferences. However, stakeholder participation has always faced challenges related to the language used for effective communication and engagement, because recreational fishers, policymakers, and other stakeholders may lack proficiency in English, compounded by the technical language often found in presentations and peer-reviewed papers emerging from the conference. Moreover, limited accessibility to primary literature has further restricted stakeholder engagement. In summary, the WRFC series not only put recreational fisheries on the global map as an important part of the fisheries sector, but also contributed to developing highly relevant networks. These networks fostered the collaboration needed between recreational fishers and other relevant stakeholder groups with fisheries scientists, managers, and policy makers to achieve effective scientific advances and knowledge integration into management practice. Another important observation is that the work presented at the WRFC has moved from largely descriptive case study reports to an increase in interdisciplinary studies aiming to bridge the gap between scientific disciplines and between basic research and effective applications (Beard et al. 2011; Schratwieser et al. 2011; Arlinghaus et al. 2013).

Seeing recreational fisheries as coupled social-ecological systems has increasingly emerged as a key theme at WRFC conferences, by highlighting that recreational fishing involves both fish stocks and ecosystems, and people (Arlinghaus et al. 2013; Arlinghaus et al. 2016). This development was particularly evident in the 6th WRFC in Berlin, Germany, where much of the science on recreational fisheries was presented using a coupled social–ecological system approach (Table 1; Arlinghaus et al. 2013). Moreover, behavior (of fish and people) was introduced as a bridging concept linking social and ecological systems under a common theoretical framework (Arlinghaus et al. 2013). The 7th WRFC in 2014 (Table 1) reinforced the need to increase interdisciplinary studies to foster a systematic understanding of recreational fisheries as complex adaptive social-ecological systems, especially in countries in transition where recreational fisheries may have immense social and economic importance but lack robust information (Arlinghaus et al. 2016). A focus on multi- and interdisciplinary approaches, as well as on "change" and "transformation" in response to new environmental and social conditions, remained central to subsequent WRFCs. The 8th WRFC (Victoria, Canada; 2017, Table 1) focused on co-management actions and involvement of diverse interest groups, including government and non-government organizations, with the goal to balance social and economic benefits with conservation targets (Brownscombe et al. 2019). An additional focus was on emerging technological and methodological advances for improving monitoring of social-ecological dynamics and engagement with recreational fishers (Brownscombe et al. 2019). The 9th WRFC was supposed to be held in 2020 in Rotterdam, the Netherlands, but was canceled due to the COVID-19 pandemic, like many other activities around the globe (Sbragaglia, Brownscombe, et al. 2023). An online event was held in 2021, which had high global engagement by more than 500 online participants from 42 different countries (Table 1). This level of engagement showed how digital technological advances facilitated a unique opportunity for networking and research in recreational fisheries, and also highlighted difficulties of incorporating such new information into governance structures and resource allocation strategies to ensure effective implementation (Sbragaglia, Brownscombe, et al. 2023). The 10th WRFC in Melbourne, Australia, in February 2023 attracted 360 delegates from 21 countries who presented more than 195 contributions (Victorian Fisheries Authority 2024: https://vfa.vic.gov.au/recreational-fishing/fisheries-management/wrfc10). The headline conference theme was "keeping pace in a dynamic and challenging world with changing fisheries" (Westaway 2023). In the proceedings of the 10th WRFC published here, we reinforce the discussion of why the WRFC is a unique forum for the development of interdisciplinary recreational fisheries sciences and why it may fertilize creativity and innovative integrative ideas in ecology, management, and conservation with functional engagement of end-users, policy makers, and stakeholders.

2 | The Challenge of Interdisciplinary and Transdisciplinary Approaches in Recreational Fisheries and the Role of the WRFC Series

Challenges of transcending traditional scientific boundaries are not exclusively technical, but can have a structural nature, such as balancing disciplinary expectations—a methodical,

TABLE 1 | Historical summary of the proceedings of the world recreational fishing conference (first line refers to the "first world angling conference" that was historically not formally considered part of the WRFC series).

Edition	Place	Year	Theme	Countries	Participants	References
0st	Cap d'Agde (France)	1984	First world angling conference	48	251	Stroud (1985)
1st	Dublin (Ireland)	1996	EIFAC symposium of recreational fisheries	23	119	Hickley and Tompkins (1998)
2nd	Vancouver (Canada)	1999	Evaluating the benefits of recreational fisheries	8	63[a]	Pitcher (1999) and Pitcher and Hollingworth (2002)
3rd	Darwin (Australia)	2002	Regional experiences for global solutions	12	196	Coleman (2003)
4th	Trondheim (Norway)	2005	Fishing is life—building partnership across boundaries	25	250	Aas et al. (2008)
5th	Dania Beach (Florida)	2008	The angler in the environment	20	220	Beard et al. (2011)
6th	Berlin (Germany)	2011	Toward resilient recreational fisheries	33	300	Arlinghaus et al. (2013)
7th	Campinas (Brazil)	2014	Change transformation and adaptation of recreational fisheries	na	na	Arlinghaus et al. (2016)
8th	Victoria (Canada)	2017	Balancing values: the future of recreational fishing around the world	20	398	Brownscombe et al. (2019)
9th	Rotterdam (Netherlands)	2020 Online –2021	Recreational fishing in a changing world	25 (42)[b]	400 (500)[b]	Sbragaglia, Brownscombe, et al. (2023)
10th	Melbourne (Australia)	2023	Keeping pace in a dynamic and challenging world with changing fisheries	21	360	This editorial

Abbreviation: na, this refers to data not available.
[a]This number refers to the total number of presentations because the total number of participants was not noted.
[b]The number between parentheses refers to the total number of online presentations.

specialized approach—with a creative, boundary-crossing nature that allows for genuine engagement and innovation across fields (Yanai and Lercher 2020; Cooke and Arlinghaus 2024). This duality requires researchers to navigate disciplinary constraints while fostering inter- and transdisciplinary connections, which can sometimes lead to a "dilemma of expertise" where crossing boundaries may reduce perceived credibility within the primary field of researchers (Yanai and Lercher 2020). In this context, creating spaces and communities to facilitate interdisciplinary collaboration and knowledge exchange is key. Such environments promote sharing of cutting-edge research and integrative solutions, and also provide a structured yet flexible setting to address challenges of balancing specialized expertise with interdisciplinary innovation, to foster cohesive scientific approaches. Such approaches are of primary importance whenever the scientific goal is to foster sustainable use of natural renewable resources, such as in fisheries, where crossing boundaries does not only refer to scientific disciplines (Cooke and Arlinghaus 2024). The WRFC series is a forum to allow such exchange, as evidenced by the output from the 10th WRFC in Australia presented in this special issue.

3 | Recreational Fisheries as Social-Ecological Activity With Economic and Human-Health Spillover

Recreational fishing extends beyond catching fish to offer a way to connect with nature, appreciate the outdoors, and enjoy benefits such as gathering food (Cooke et al. 2018), while fostering social connections and promoting psychological well-being (Arlinghaus et al. 2002; Granek et al. 2008). Recreational fishing can foster a sense of community by encouraging conservation stewardship, active engagement with science, and promoting mental well-being through relaxation and skill-building (Arlinghaus and Cooke 2009; Shephard et al. 2022; Sbragaglia, Arlinghaus, et al. 2023). Recreational fishing can also play a significant role in the economy by supporting local businesses, tourism, and creating jobs in areas like equipment manufacturing, guiding services, and hospitality (Ditton et al. 2002; Potts et al. 2022; Smith et al. 2023). Strehlow et al. (2023) offered an example of a marine fishery in northern Germany showing that marine recreational fisheries can have substantially greater job effects and economic impacts than small-scale commercial fisheries. This importance calls for greater consideration

of recreational fisheries interest in local and regional fisheries and coastal zone management (Arlinghaus et al. 2023)—a call directed to policymakers in many areas where the economic importance of recreational fisheries is either unknown or disregarded (Grati et al. 2024). Recognizing these gaps, Perez and Adams (2024) considered shared resources of connected fish populations and ecosystems to develop a strategic plan for the economically and culturally important Yucatán Peninsula flats fishery, as a model applicable to other fisheries and from local to regional scales. To highlight the importance of incorporating community input, a multi-faceted approach was used, including strengths, weaknesses, opportunities, and threats analysis, online surveys, and semi-structured interviews. Through identifying stakeholder priorities and conservation challenges, Perez and Adams (2024) outlined four key actions that required collaboration across sectors in: (1) developing applied science initiatives to address management and conservation needs, (2) implementing education and awareness campaigns, (3) integrating flats fisheries into conservation, management, and economic planning, and (4) enforcing proposed regulations. While regional frameworks like those proposed by Perez and Adams (2024) addressed broader management and conservation initiatives, more targeted approaches are also required because intensive recreational fishing can exert ecological impacts by influencing fish populations, aquatic habitats, and ecosystem dynamics (Lewin et al. 2006; Lewin et al. 2019; Sbragaglia, Arlinghaus, et al. 2023; Griffin, Fordham, et al. 2024). Ecological impacts of recreational fisheries strongly depend on recreational fisher behavior, and thus, have a social and economic dimension (Arlinghaus et al. 2013), and recreational fishers may continue fishing even on extremely small stock sizes because of the attraction offered by no-catch motivations such as the challenge of the pursuit (Arlinghaus 2024). Effective research and management of recreational fisheries is, therefore, challenging and differs from commercial fisheries models (Arlinghaus and Cooke 2009; Arlinghaus et al. 2019), which in many cases necessitates crossing disciplinary boundaries in research and practice (e.g., science/society or basic/applied approaches; Cooke and Arlinghaus 2024). An interesting example of an innovative interdisciplinary approach to solving local issues is presented by Durante et al. (2024). Their study integrates ecological data (e.g., biomass of a target species) with fisher behavior (e.g., internet connectivity) and market information (e.g., price of target species) to better understand harvester dynamics toward sustainable management of recreational fishing for the Pipi (*Latona deltoides*) in South Australia. Specifically, Durante et al. (2024) sourced publicly available datasets on fisher demography, market forces, and internet connectivity, and using principal component analysis—identified three key historical periods in the fishery, addressed gaps in the time-series of effort and catch estimates from on-site surveys, and explained the motivations of recreational fishers. The approach demonstrated that combining social and economic data on the fishery (including information that is sourced innovatively through social media analytics) with ecological data can greatly help to understand the drivers of effort and catch to inform sustainable management of recreational fishing resources.

In another study, Blyth et al. (2024) used an integrative methodological approach merging creel surveys, experimental fishing, and spawning returns to understand angler-stock interactions in a data-poor recreational fishery. They focused on a brown trout (*Salmo trutta*) fishery in Sweden by comparing angler expectations, catch data, and spawning stock characteristics. Anglers accurately estimated the presence of large fish but underestimated the role of natural reproduction in replenishment. Larger females, crucial for stock sustainability, faced higher harvest pressure, and management scenarios showed that small regulatory or behavioral shifts could significantly alter stock dynamics. The authors concluded that understanding angler preferences and integrating voluntary conservation behaviors with formal regulations could improve fishery sustainability while maintaining its socio-economic benefits. In this context, the human health impacts of consuming fish—and especially large fish—from recreational fisheries, particularly in relation to the presence of contaminants, were poorly understood. Addressing this gap, Taylor et al. (2024) quantified bioaccumulative contaminants, including perfluoroalkyl acids (PFASs), in various fish species across multiple eastern Australian estuaries. Using a combination of empirical field sampling and telephone diary surveys, they found that contaminant concentrations varied across environments and species, with the lowest levels detected in the most frequently harvested species. Taylor et al. (2024) also discussed how interspecies variability in contaminant levels may affect recreational fishers' objectives and satisfaction while emphasizing the need for further research into ecological drivers of these patterns and long-term effects of contaminants on animal and human health.

4 | Transforming Traditional Management Approaches in Recreational Fisheries: Stocking and Catch-and-Release

Stocking and catch-and-release are two historically dominant topics with constant representation in the WRFC. The 10th WRFC was no exception. Studying these issues is increasingly sophisticated by relying on modern technology for tracking fish and fishers and whole-system experimentation for gathering robust knowledge. Matern et al. (2024) presented a set of stocking experiments with controls in German small lakes with five fish species to document the widespread lack of success of fish stocking. As an alternative to stocking fish, managers could engage in habitat enhancement, which has benefited similar lake types in Germany (Radinger et al. 2023). When fishing mortality is the key source of stock declines, harvest regulations (Rogers et al. 2010) and increasing catch-and-release rates can be stock-conserving. Catch-and-release is widely used as a conservation and management tool, either through regulatory mandates or voluntarily adopted actions (Arlinghaus et al. 2007; Cooke and Schramm 2007). However, catch and release can have unintended consequences (Cooke et al. 2006), including lethal and sublethal effects on individual fish and potential population-level impacts (Post et al. 2002; Kerns et al. 2012), including contributing more fishing mortality than harvest in some recreational fisheries (Douglas et al. 2010). As a result, general and species-specific best practices have begun to be developed (Cooke and Suski 2005; Brownscombe et al. 2017). This issue features several studies examining the effects of catch-and-release and best practice recommendations across a range of species and regions. Hussey et al. (2023) investigated the performance of hook removal tools and bare hands with four hook types in freshwater

sunfish species. The authors reported that circle hooks were more difficult to remove and caused greater amounts of tissue tear. For best practices, hemostats should be used for hook removal to reduce difficulty, tissue tears, and long exposure periods during unhooking. Griffin, Hollema, et al. (2024) examined physical injury, physiological stress, and behavioral impairment of catch-and-release on striped bass (*Morone saxatilis*) along the US Atlantic coast, where it is part of an economically valuable recreational fishery, to highlight how specific angling components, such as hooking location and fight time, influence outcomes. Specifically, Griffin, Hollema, et al. (2024) showed that behavioral impairment increased when striped bass were hooked in critical locations with J hooks, but physiological stress increased with prolonged fight time. Similarly, Danylchuk et al. (2024) examined milkfish (*Chanos chanos*) responses to catch-and-release in the Seychelles to debunk the myth that milkfish do not accumulate blood lactate. While the authors recommended anglers limit angling events to 20–30 min, they found that milkfish may begin to physiologically recover during the angling event when fight times exceeded 60 min. Further, Pringle et al. (2024) investigated post-release metabolic stress in two Namibian cob species (*Argyrosomus inodorus* and *A. coronus*) to demonstrate that persistent physiological impairment post-release may last up to 10 h. This highlights the potential for delayed recovery and the need for studies to evaluate post-release impairment long after release. Roser et al. (2024) explored the impacts of recreational fishing on northern pike (*Esox lucius*) in the southern Baltic Sea. They found that in unprotected sites, pike abundance and the presence of large individuals were lower than in partially protected areas. Additionally, pike in unprotected sites had higher levels of lure avoidance behavior that contributed to angling-induced timidity. Collectively, these studies illustrate the challenges and nuances in managing stocking and catch-and-release in recreational fisheries and emphasize the need for innovative, species-specific, and regionally tailored approaches to ensure sustainable practices.

5 | Sustainable Recreational Fisheries: From Low- to High-Income Countries

Achieving global sustainability of recreational fishing is linked to understanding social-ecological dynamics in low-, middle-, and high-income countries because recreational fisheries are developing rapidly (Arlinghaus et al. 2021), while capacity for management is often low (Potts et al. 2020). In low-income countries, recreational fishing is often intertwined with food security, economic livelihoods, and cultural traditions, yet limited resources for monitoring and governance can hinder sustainable management. Gusha et al. (2024) found that the recreational fishery in Namibia was facing concerns regarding sustainability because of a lack of knowledge of the fish and the fishery. To address this issue, the authors conducted a horizon scan survey of stakeholders, including fisheries managers, anglers (specialists and non-specialists), and scientists. Survey responses revealed 58 research questions or knowledge gaps for further investigation across 11 high-priority themes related to governance, human dimensions, compliance, fisher outreach, education, engagement, competing sectors or groups, and perceived threats. Results also revealed a disjunction between questions by non-specialist fishers and those raised by specialist fishers and scientists. The authors concluded that these research questions could be used by management agencies and policymakers to understand and better address the desired objectives of sustainability, good co-management with recreational fishers, and governance in Namibian recreational fisheries. In another study, Smallwood et al. (2024) explored the integration of traditional and contemporary measures to support sustainable management of Blue Swimmer Crab (*Portunus armatus*) fisheries in Western Australia. Using data from five broad-scale phone-diary surveys between 2011 and 2021, they evaluated fishing effort, catch, and fisher demographics across 12 small-scale fisheries. Results showed declines in participation and harvest in some regions, while others remained stable. Findings highlighted the importance of incorporating both biological and social data into management strategies. The study demonstrated that broad-scale survey data can be effectively adapted to inform ecological, social, and economic objectives in recreational fisheries management, as a model for similar data-limited fisheries worldwide.

As recreational fisheries continue to evolve, especially in high-income countries, understanding the key factors shaping future fishing participation and behavior is crucial for effective management and policy development. Stensland et al. (2024) conducted a Delphi study with 93 experts to identify key drivers influencing future angling participation in Denmark, Finland, Iceland, Norway, and Sweden, which shared comparable recreational fishing opportunities due to similarities in culture, governance, climate, and environment. They found that habitat quality, fish populations, and access to fishing information were the primary factors affecting participation. Local angling was predicted to decline in Norway and Finland, but was expected to increase in the other countries. Growth in tourist angling was anticipated across all five nations. Broader societal factors, such as urbanization and climate change, were not considered major drivers in the short term but may be integrated into future recruitment and retention strategies for sustainable fisheries management. Using the same approach, van den Heuvel et al. (2024) used the same Delphi study to forecast future trends in angler behavior across the same Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden). Through three survey rounds involving 20 experts per country, they identified expected increases in (i) fly fishing in Iceland, Sweden, and Finland in particular, (ii) angler stewardship toward protection and restoration of aquatic systems associated with angling, and (iii) use of social media and technology to understand harvest patterns and angler characteristics. Other trends included a shift toward predator fishing and urban angling, while ice fishing and bait fishing were expected to decline in some regions due to climate change and evolving angler preferences. The study highlighted the importance of adapting management strategies to align with emerging trends and the role of digital platforms in shaping modern angling practices. These two studies provided a view of future angling in Nordic countries and how it is expected to be shaped by increasing stewardship, digital engagement, and shifts in fishing techniques, while climate change and evolving social dynamics will influence participation and target species, thereby requiring adaptive management strategies. At a broader international level, both studies also serve as examples of how future research and management of recreational fisheries might benefit from considering differences and similarities across countries when determining expected trends.

6 | New Technologies for Studying and Managing Recreational Fisheries

The use of robust data collection is important for effective management of recreational fisheries. In recent years, digital approaches have received a lot of attention for supplementing (or even replacing) traditional methods. Among different digital approaches, those that are playing the most relevant role are recreational fishing apps (Venturelli et al. 2017), while digital fisheries data, such as those shared on social media, may have potential (Sbragaglia et al. 2020; Lennox et al. 2022). Classic methods for monitoring recreational fisheries suffer from several biases (e.g., phone survey; Pollock et al. 1994), and digital methodologies are no different (Vitale et al. 2021). For example, Ryan et al. (2024) compared phone and online surveys in assessing recreational fishing participation and effort in Western Australia. They found that response rates were significantly higher for phone surveys (97%–98%) than online surveys (13%–26%). Online surveys overrepresented avid fishers, with 41%–54% classified as avid anglers, compared to 37%–40% for phone surveys. While marine fishing participation rates were similar across both methods, self-administered online surveys likely led to selection bias (e.g., respondents were more likely to opt out). The study highlighted challenges of survey mode selection and recommended further research to quantify and correct biases, to ensure the reliability of novel digital approaches for fisheries management. Similarly, Trinnie and Ryan (2024) compared fisher demographics and fishing behavior between phone-recall and smartphone app surveys for recreational angling in south Western Australia. Over a 12-month period, they assessed survey participation, effort, and catch rates. The app survey had lower response rates, but a higher proportion of freshwater fishers and avid fishers (i.e., those who have fished 20 days or more in the last 12 months) than phone surveys. Catch and effort estimates differed slightly, with app participants reporting less fishing effort. While app surveys offer real-time data collection, lower response rates and selection bias remain challenges, particularly with avid anglers being overrepresented. The study highlighted the need for comparative studies with probability survey designs and the potential role of post hoc adjustments to digital survey methods to ensure representative data for fisheries management. In another study, Gundelund et al. (2024) analyzed factors influencing participation and sustained engagement in a Danish electronic citizen science platform for anglers. They categorized users into registrants (non-contributors), contributors (single-year data providers), and sustained contributors (multi-year data providers). They found that willingness to share information and the importance of angling as a hobby drove participation. Age and experience influenced contribution patterns, with younger anglers more likely to start contributing while older anglers were more likely to sustain participation. Geographic location also affects retention. The study highlighted challenges in maintaining long-term engagement and suggested refining platform design and recruitment strategies to ensure representative and stable participation for fisheries data collection. Finally, McDonald et al. (2025) examined the potential of digital catch log data from a popular fishing app to detect climate-induced changes in freshwater game fish abundance across the contiguous United States during 2015–2021. They found an increasing prevalence of warm-water species, often at their northern range limits, while cool- and cold-water species declined, particularly at their southern boundaries. These trends suggested a potential climate-driven shift in fish distributions. However, biases in catch log data, including angler behavior and alternative environmental factors, necessitate further validation. Their findings reinforced the promises of digital fishers-sourced data for large-scale fisheries monitoring in response to global changes (Sbragaglia et al. 2021; Sbragaglia, Espasandín, et al. 2023; Espasandín et al. 2024), but called for integrating additional ecological data to refine its reliability as an early-warning system for climate impacts on fish populations. In conclusion, digital technologies provide innovative approaches for recreational fisheries research and management, but challenges remain in ensuring representative participation and sustained engagement. Addressing biases in digital data collection methods will be crucial for boosting research applications and increasing the robustness of monitoring activities by integrating digital non-probabilistic tools with traditional probabilistic survey approaches.

7 | Concluding Remarks

Studies presented in this issue underscore the importance of balancing conservation priorities with the diverse values and motivations of recreational fishers to ensure sustainable fisheries that continue to provide benefits for both nature and people. The WRFC series has played a crucial role in shaping discourse around historically significant topics in recreational fisheries, such as catch-and-release practices and the effectiveness of fish stocking. While stocking has often been viewed as a tool to enhance fisheries, recent research using robust before-after-control-impact designs suggests that habitat restoration may be a more sustainable alternative in some cases. Similarly, while catch-and-release is widely used to support conservation efforts, studies emphasize the need to develop species-specific best practices to minimize post-release mortality and stress. Discussions and findings shared at the last WRFC conference—and presented in this special issue—have helped to refine scientific understanding and management strategies of these two and many other topics (e.g., trends in participation), by reinforcing the need for evidence-based policies that account for both ecological integrity, recreational fishing experiences, and broader global changes. The WRFC series has also provided a global platform for comparing recreational fisheries across diverse socio-economic contexts. While high-income countries often have well-established management systems, many low- and middle-income countries face challenges related to data deficiencies, governance limitations, and balancing fisheries for recreation and subsistence. That said, even high-income countries are often data-deficient because recreational fisheries are often not studied with the same level of rigor as commercial fisheries. Despite these challenges, research presented in this special issue demonstrates how stakeholder engagement, adaptive management, and interdisciplinary collaboration can contribute to more sustainable fisheries by ensuring conservation success and socio-economic benefits in countries with widely different incomes. Finally, technological advancements are transforming the way recreational fisheries are studied and managed. Digital tools, such as recreational fishing apps, social media analytics, and citizen science initiatives, provide valuable data for monitoring fishing effort, species distribution, and environmental

changes. However, these innovations also introduce challenges, such as unknown biases, privacy concerns, and integration with traditional survey methods. The WRFC has been instrumental in fostering discussions of how to harness these digital tools effectively while maintaining scientific rigor. Studies presented in this issue highlight the opportunities and limitations of digital fisheries data, while reinforcing the need for a balanced approach that combines emerging technologies with established monitoring techniques to improve management outcomes.

Throughout its history, the WRFC has evolved from primarily descriptive studies to a forum that integrates social, ecological, and economic dimensions of recreational fisheries. The conference series has been instrumental in breaking disciplinary silos, bridging the gap between science and management, and fostering interdisciplinary collaborations. By providing a space for researchers, policymakers, and stakeholders to engage in dialogue, WRFC has helped shape the future of recreational fisheries management by promoting innovative and integrative solutions to emerging challenges. By continuing to strengthen these interdisciplinary connections, the WRFC will ensure that the field remains adaptive and capable of addressing emerging challenges in recreational fisheries sustainability. We have found the WRFC to be invaluable in our own careers, and we encourage researchers, especially early career researchers, to consider attending!

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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